

SI/cs 021174WO

02 July 2004

5

Claims

1. Beta titanium alloy containing (in mass %):

10

V: 10 to 17%,

Fe: 2 to 5%,

Al: 2 to 5%,

Mo: 0.1 to 3%,

15

and optionally one or more alloy elements from the group of Sn, Si, Cr, Nb, Zr according to the following proportions:

20

Sn: 0.1 to 3%,

Si: 0.1 ≤ 2%,

Cr: ≤ 2%,

Nb: ≤ 2%,

Zr: ≤ 2%,

25

wherein the beta titanium alloy may additionally comprise contents of C and of elements from the group of the lanthanides,

and as the remainder Ti and inevitable impurities.

30

2. Beta titanium alloy containing (in mass %):

V: 10.00 to 17.00%,

Fe: 2.00 to 5.00%,

Al: 2.00 to 5.00%,

Mo: 0.10 to 3.00%,

and optionally one or more alloy elements from the group of Sn, Si, Cr, Nb, Zr according to the following proportions:

Sn: 0.10 to 3.00%,

Si: 0.10 to 2.00%,

Cr: ≤ 2.00%,

10 Nb: ≤ 2.00%,

Zr: ≤ 2.00%,

and as the remainder Ti and inevitable impurities.

- 15 3. Beta titanium alloy according to any one of the preceding claims, containing 12 to 17 mass % V.
4. Beta titanium alloy according to any one of the preceding claims, containing 0.5 to 3 mass % Mo.
- 20 5. Beta titanium alloy according to any one of the preceding claims, containing 0.5 to 3 mass % Sn.
6. Beta titanium alloy according to any one of the preceding claims, characterised in that at ambient
- 25 temperature it has a yield point $R_{p0.2}$ of at least 1,400 MPa.
7. Beta titanium alloy according to any one of the preceding claims, characterised in that at ambient
- 30 temperature it has a tensile strength R_m of at least 1,500 MPa.

8. Beta titanium alloy according to any one of the preceding claims, characterised in that at ambient temperature it has a plastic strain $\epsilon_{p0.2}$ of more than 4%.
- 5
9. Beta titanium alloy according to any one of the preceding claims, characterised in that its density ρ does not exceed 4.8 g/cm³.
- 10
10. Method for manufacturing a product produced from a beta titanium alloy, comprising the following steps:
- 15
- melting a beta titanium melt having the composition according to any one of claims 1 to 9 to form a preliminary product in block form,
 - hot-forming the preliminary product,
 - hot end forming the hot-formed preliminary product to form a hot end product,
 - 20
 - solution annealing the hot end product,
 - cold-forming the hot end product to form an end product,
 - 25
 - curing treatment of the end product.
11. Method according to claim 10, characterised in that the hot end forming process is carried out as a hot-rolling process.
- 30
12. Method according to claim 11, characterised in that the hot-rolling process is followed by a coiling process.

13. Method according to claims 10 to 12, characterised in that the alloy elements V, Fe and Al are added by alloying in the form of a master alloy.
- 5
14. Method according to any one of claims 10 to 13, characterised in that the preliminary products are rounded blocks, which are hot-formed during the hot-forming process to form billets or mill bars.
- 10
15. Method according to any one of claims 10 to 14, characterised in that the hot end product is a wire or a metal sheet.
- 15
16. Method according to any one of claims 11 to 15, characterised in that the hot end product is solution annealed after the coiling process.
- 20
17. Method according to claim 16, characterised in that the solution annealed hot end product is cold-formed.
18. Semi-finished product produced from a beta titanium alloy having the composition according to any one of claims 1 to 9.
- 25
19. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of components that are used in the temperature range from -196°C to 300°C .
- 30
20. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of vehicle components.

21. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of components used in plant or apparatus engineering.

5

22. Use of a beta titanium alloy having the composition according to any one of claims 1 to 9 for the production of sports equipment.